Legenere
(*Legenere limosa*)

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Status

Federal: None

State: None

Other: California Native Plant Society List 1B

Recovery Plan: None

Placer Legacy Category: Class 3

Distribution

California

Legenere is endemic to northern California in the Coast and Cascade Ranges and the Central Valley. Current information indicates 46 extant occurrences, seven extirpated occurrences (including the type locality), and one possibly extirpated occurrence (California Natural Diversity Database 2002; Jones & Stokes 2002; Preston pers. comm.). The majority of known extant occurrences (29) are concentrated in Solano and Sacramento Counties, with the remaining 18 occurrences scattered in Lake, Napa, Placer, San Joaquin, San Mateo, Shasta, Sonoma, Tehama, and Yuba Counties (Holland 1983; Platenkamp 1998; California Natural Diversity Database 2002). Legenere is considered extirpated from Stanislaus County (California Natural Diversity Database 2002).

Placer County Phase I Planning Area

Historical

Very little information exists on the historical distribution of legenere prior to urbanization within the Phase 1 Planning Area. Only two occurrences have been recorded in the California Natural Diversity Database (CNDDB), and one of these is reported to be extirpated (California Natural Diversity Database 2002).

Current

Legenere is currently known from only two extant occurrences in the Phase 1 Planning Area. One of the occurrences is located north of Pleasant Grove Creek, south of Placer Boulevard, and east of Highway 65. Surveys conducted by Jones & Stokes in 2002 located a second occurrence at the Orchard Creek Conservation Bank approximately 3 miles southwest of Lincoln, California (Jones & Stokes 2002). This occurrence had not been recorded in the CNDDB as of preparation of this account.

Population Status & Trends

California

Occurrences in California are located on private property as well as on land owned by the Sacramento Municipal Utility District; Sacramento County Parks and Recreation District (South Florin County Park);

Sacramento County (the Sacramento Regional Wastewater Treatment Plant Bufferlands and the former Mather Field Air Base); Solano County Farmlands and Open Space Foundation (Jepson Prairie); the California Department of Fish and Game (the Calhoun Cut Ecological Reserve in Solano County and the Dales Lake Ecological Reserve in Tehama County); and the Department of Defense (Beale Air Force Base) (California Natural Diversity Database 2002). The current status and trends of legenere populations in California are unknown; however, a number of the known occurrences have been extirpated (California Natural Diversity Database 2002). Legenere populations, like those of many vernal pool species, fluctuate in abundance from year to year, depending on the amount of rainfall. Estimates of some populations have fluctuated from no plants observed in consecutive dry years to thousands of plants in a year of normal or high rainfall, indicating that populations persist by means a dormant seed bank. (Holland 1983; California Natural Diversity Database 2002.)

Placer County Phase I Planning Area

The two known occurrences in the Phase 1 Planning Area are located on private lands. One of these is within the Orchard Creek Conservation Bank and is protected in perpetuity by a conservation easement as part of the mitigation bank. The second occurrence is located within a developing area and has not been observed since 1984. Although the population is presumed to be extant, the CNDDB indicates that a portion of the vernal pools in this area are reported to be extirpated; consequently, the current status of this population is unknown (California Natural Diversity Database 2002).

Natural History

Life History

Legenere is an inconspicuous glabrous annual that grows to approximately 4–6 inches tall, but that can attain heights of up to 12 inches (Morin 1993). Legenere produces early deciduous submerged leaves that are linear and 0.5–1.2 inches long. Emergent stems produce elliptical, leaf-like bracts. The species has erect lateral branches that are stiff and sometimes fleshy. The corolla, when present, is bilaterally symmetric with five lobes and is greenish-white or yellowish in color. Cylindrical capsules are borne on slender, elongate pedicels and contain up to 20 smooth brown seeds. The flowering period for legenere is generally from April through June depending on the depth of the vernal pool or the duration of ponding (California Native Plant Society 2001). Legenere can occur within matted vegetation at the bottom of drying vernal pools. It can be difficult to locate in the field because of its relatively inconspicuous flowers and sprawling habit within matted vegetation composed of other, superficially similar species.

Habitat Requirements

Legenere is found in vernal pools and swales, seasonal marshes, artificial ponds, floodplains of intermittent streams, and other seasonally inundated habitats (Holland 1983; Morin 1993; California Natural Diversity Database 2002). Wetlands that support legenere are typically inundated for long periods and range in size from slightly more than 40 square feet to 100 acres (Holland 1983; California Natural Diversity Database 2002). In the larger habitats, legenere grows only in areas inundated to less than 8 inches (Holland 1983). This species occurs in northern basalt flow, northern claypan, northern hardpan, northern volcanic ashflow, and northern volcanic mudflow vernal pool types and could occur on any of the geomorphic types within the Phase 1 Planning Area boundaries (Sawyer and Keeler-Wolf 1995). Soils are generally shallow, acidic clays over a hardpan or volcanic substrate (Holland 1983). Surrounding plant communities are typically grasslands. At one recorded occurrence in Solano County, legenere was found in a vernal pool as well as the adjacent grassland. Elevations of occurrences range from 10 feet in Solano County to 2,900 feet in Lake County. The latter occurrence (and another at 2,400 feet) were recorded in the 1950s; subsequent surveys in the 1980s found the habitat but not the legenere. (California Natural Diversity Database 2002.)

Reproduction and Dispersal

Legenere begins growth underwater and flowers in April or early May. The seeds germinate between late February and April while water is still present, with flowering completed by the time the vernal pool is dry in June. Field surveys indicate that the optimal identification period for this species is limited to a 6- to 8-week period. Each plant produces six to ten capsules, which produce several hundred seeds. The timing and mechanisms of seed dispersal are unknown, but dispersal agents could include gravity, water, and possibly waterfowl. Intact capsules may hold seed, if undisturbed, and float to other hydrologically connected areas in the following winter. (Holland 1983.) The chromosome number has not been determined for legenere.

Ecological Relationships

Legenere often has apetalous flowers (i.e., flowers without petals) suggesting that legenere may self pollinate (Holland 1983); however, pollination studies have not been completed. Very little information is known regarding the intra- and interspecific interactions among vernal pool plants such as legenere. It has been found in both natural and artificial vernal pools (California Natural Diversity Database 2002). Common associates found with legenere include smooth goldfields (*Lasthenia glaberrima*), creeping spikerush (*Eleocharis macrostachya*), three-sepaled buttercup (*Ranunculus bonariensis* var. *trisepalus*), and hairgrass (*Deschampsia danthonioides*). It can also co-occur with several other rare plants, including Boggs Lake hedge-hyssop (*Gratiola heterosepala*), dwarf downingia (*Downingia pusilla*), Sebastopol meadowfoam (*Limnanthes vinculans*), many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*), Sacramento orcutt grass (*Orcuttia viscida*), slender orcutt grass (*Orcuttia tenuis*), and Sanford's arrowhead (*Sagittaria sanfordii*) (California Natural Diversity Database 2002). In addition to other rare plants, legenere is also thought to co-occur with rare invertebrate species including vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*), although this has not been well documented.

Population Threats

The number of known extant populations of legenere has increased in the last 20 years, but the quality and quantity of vernal pool habitat have declined over the same period. Habitat of legenere populations has been lost or degraded through agricultural and urban development, overgrazing, agricultural practices, changes in hydrology, recreational use, trash dumping, and competition from nonnative plants (Holland 1983; California Department of Fish and Game 1992, 1998; California Native Plant Society 2001; California Natural Diversity Database 2002). Only two populations of legenere are known from the Phase 1 Planning Area, and both the quality and quantity of available habitat there are in decline. Land uses adjacent to occupied vernal pool habitat can affect vernal pool inundation periods and water quality, introduce exotic species, encourage recreational use, and encourage trash dumping. The full effects of these factors are unknown.

Due to the unique hydrology of vernal pools (i.e., legenere habitat), they typically support species adapted to a specific hydrologic regime, and are therefore somewhat resistant to the effects of exotic species that cannot tolerate prolonged periods of inundation. Several species, including mannagrass (*Glyceria*) and common frog-fruit, are reported to compete with legenere in its habitat (Holland 1983; California Natural Diversity Database 2002).

Due to the short survey window for this species, surveys timed correctly over the identification window (approximately 8 weeks as described above) are essential to obtain an adequate inventory. Inadequate or incorrectly timed surveys leading to the loss of undocumented or undiscovered populations is a threat to legenere.

Conservation Considerations

Status of Recovery Planning

No federal or state recovery plan has been prepared for legenere. A Vernal Pool Recovery Plan is currently being prepared by the U.S. Fish and Wildlife Service (USFWS); this plan would include habitat for legenere. In addition, proposed vernal pool critical habitat was recently released by USFWS for 11 federally listed vernal pool plants. Federally listed species are covered under the proposed vernal pool critical habitat; accordingly, the list does not include legenere. However, vernal pools that would be habitat for legenere are included in the proposed habitat designations.

Compatible Land Uses

Currently, lands containing occupied vernal pool habitat are utilized for agricultural (grazing) and recreational uses. The full effects of these uses on legenere populations have not been evaluated.

Conservation Needs

Reserves managed for this species should include numerous vernal pools and their upland watersheds. Reserves should be large enough to be self-buffered from adjacent land use—especially urban development, agriculture, or other intensive uses.

Data Gaps and Conservation Implications

The most recent information indicates 47 extant populations of legenere throughout its range (California Natural Diversity Database 2002; Jones & Stokes 2002). Due to the brief survey window for finding legenere and because the plants are inconspicuous, it is likely that undiscovered or unrecorded populations exist.

Ongoing monitoring of legenere populations near roads and other development is needed to assess the potential hydrologic effects of a limited buffer area on the ability of populations to persist. Additional management of these populations, including alteration of existing buffer areas to reduce indirect impacts, might be required for preservation.

The current knowledge regarding the life history and specific habitat requirements of legenere is limited but indicates that the species may be self-compatible; that seeds may be dispersed by waterfowl in addition to gravity and water; that seeds can remain dormant during dry years; that suitable vernal pool habitat in the Phase 1 Planning Area includes vernal pools that have a relatively long period of inundation; and that overgrazing, competition with other plant species, changes in hydrology, and recreational use of habitat may adversely affect the species (Holland 1983; California Natural Diversity Database 2002).

Gaps in the current knowledge include: whether legenere is only self-pollinating; how long dormant seed remains viable (i.e., how long the species can survive drought); the seed germination requirements (e.g., the effects of varying hydroperiod); the role of waterfowl in seed dispersal; the specific soil types and characteristics that support this species at the known occurrences (i.e., suitable habitat for legenere); what animals consume legenere; the effects of various managed grazing regimes (e.g., effects of managed grazing to enhance habitat by reducing competition from nonnative invasive species); the potential plant competitors; possible relationships with mycorrhizal associates; and legenere's susceptibility to pathogens. The best approach for addressing these research needs is to preserve and monitor existing, successful populations, as well as to encourage and document studies on the existing populations throughout the species' range. Information from such studies can be used for adaptive management of

habitat; such management could include restrictions on traditional land use and implementation of appropriate grazing regimes as a management tool. Information on life history and habitat will assist in identifying potential threats to the species' survival and its tolerance for varying conditions.

There is virtually no existing information regarding the genetic relationships of the extant populations. Such information could be used to accurately distinguish population relationships, establish the distance of seed dispersal, and clarify the limits of individual populations.

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Personal Communications

Preston, Rob, Ph.D. Botanist, Jones & Stokes. Meeting regarding CNDDB occurrence number 31.